

# **MISSOURI NOSOCOMIAL INFECTION REPORTING DATA**

**Report to the Governor and  
General Assembly  
December 2014**

**Missouri Nosocomial Infection Reporting Data  
Report to the Governor and General Assembly - 2014**

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## **Executive Summary**

### **Background**

In 2004, the Missouri legislature passed Senate Bill 1279, establishing the “Missouri Nosocomial Infection Reporting Act of 2004”. The law requires hospitals and ambulatory surgical centers (ASCs) to report specific categories of healthcare-associated infections (HAIs) to the Department of Health and Senior Services (DHSS). Beginning in January 2012, certain hospitals that were deemed to be critical access started reporting data to the Center for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN). In September of that year, DHSS started to transfer certain required pieces of information to the Missouri Healthcare-Associated Infection Reporting System (MHIRS) from NHSN. This report summarizes data for the January 1, 2013-December 31, 2013 time frame on central line-associated bloodstream infections (CLABSI), surgical site infections (SSIs) and head of bed (HOB) elevation.

### **Data Collection**

The infections mandated for reporting in SB 1279 include ventilator-associated pneumonias (VAPs), CLABSI and SSIs. CLABSI are reported by hospitals for six intensive care unit (ICUs) types-- coronary, surgical, medical/surgical, medical, neonatal and pediatric. SSIs are reported by facility, but not ICU. Hospitals report SSIs associated with abdominal hysterectomy, hip repair and coronary artery bypass surgery. ASCs report SSIs associated with hernia repair and breast surgery. In lieu of measuring the incidence of VAP, hospital ICUs report the percent of their ventilator patients with appropriate HOB elevation. HOB elevation of at least 30 degrees lowers the risk of developing VAP.

### **Reporting to the Public**

The DHSS has developed a public website to report healthcare-associated infection rates. The site provides the most current four quarters of data for viewing. At the time this report was prepared, SSI, CLABSI and HOB elevation data for January 1, 2013- December 31, 2013 were available on the website ([http://health.mo.gov/data/hai/drive\\_noso.php](http://health.mo.gov/data/hai/drive_noso.php)). Data for the next reporting period, July 1, 2013- June 30, 2014, will be published on the website during the first quarter of CY2015. In October 2011, a table of historical data was added to the website. Data on the number of infections and procedures and the percent of HOB elevation compliance for 2006-2010 are currently displayed in that table.

### **Data Summary**

Hospitals submit data for each ICU that meets DHSS reporting requirements. In all, 92 ICUs from 65 hospitals reported CLABSI data for January 1, 2013-December 31, 2013. Statewide infection rates for CLABSI were lowest in the coronary ICUs (0.3/1000 central line-days) and highest in the pediatric ICUs (1.2/1000 central line-days). Missouri’s CLABSI rates for four of the six reporting ICU types have dropped between 38 and 64 percent relative to the January 1, 2012 to December 31, 2012 reporting period.

Forty-eight hospitals and 22 ASCs reported SSI data. The lowest SSI rate for hospitals overall was for abdominal hysterectomy (0.8/100 surgeries). The highest rate was for coronary artery bypass surgery (1.9/100). The ASCs also report infection rates for hernia repair and breast surgery. Infection rates for both of these surgery types were lower than 1.0/100 surgeries.

Forty-five hospitals reported HOB elevation for ICUs with ventilator patients. The ideal is to have every hospital/ICU combination comply with HOB standards (usually elevation of 30 degrees or more) for 100 percent of their ventilator patients. Generally, Missouri hospitals performed quite well in that regard. While none of the ICU types reached 100 percent compliance for every reporting hospital, the average statewide compliance rate for each of the five types of reporting ICUs was 98.4 percent, an increase in compliance from 2012. All but six of the 63 hospital/ICU combinations had an average compliance rate of 95 percent or better. In fact, 23 of the 63 hospital ICU combinations had 100 percent compliance.

### Cautions

Infection rates are affected by a facility's level of resources and commitment to infection control, the severity of the illnesses treated, and the care with which it collects and reports data. A consumer who is choosing a facility for healthcare should consider the advice of their physician, the experience of facility staff, and all the other factors that are unique to his or her situation, in addition to the infection and HOB elevation data reported on the DHSS website.



## **Missouri Nosocomial Infection Reporting Data Report to the Governor and General Assembly - 2014**

### **Background**

Healthcare-associated infections (HAIs), also known as nosocomial infections, are infections that occur while patients are in a healthcare setting. Because of the seriousness of their conditions, patients treated in intensive care units (ICUs) have an especially high risk of HAIs. HAIs can severely aggravate an illness, lengthen hospital stays and spread to other individuals. HAIs continue to be a major public health problem in the United States. “Guidance on Public Reporting of Healthcare-Associated Infections...,” published by the Healthcare Infection Control Practices Advisory Committee (HICPAC) in 2005<sup>1</sup>, reported that in hospitals alone, HAIs accounted for an estimated 2 million infections, 90,000 deaths and \$4.5 billion dollars in excess healthcare costs annually. A 2010 study reported that adverse events cost Medicare an estimated \$324 million in October 2008.<sup>2</sup> Roughly 1 in every 25 U.S. hospital patients will acquire at least one healthcare associated infection.<sup>3</sup>

In 2004, the Missouri legislature passed Senate Bill 1279, establishing the “Missouri Nosocomial Infection Reporting Act of 2004”. The intent of the law is to establish conditions that lead to a decrease in HAIs in Missouri. The law requires hospitals and ambulatory surgical centers (ASCs) to report specific categories of HAIs to the Department of Health and Senior Services (DHSS).

The law also requires the DHSS to publish reports on the department’s website and to submit an annual report to the Governor and members of the General Assembly. Rather than including copies of every table from the website, this report summarizes the data and presents representative tables.

### **Data Collection**

Procedures and HAIs are reported to the DHSS according to 19 CSR 10-33.050, which became effective July 30, 2005. The reporting rule was promulgated under the authority of the revised statute that mandates data reporting by hospitals and ASCs (Section 192.667, RSMo). The data that are collected follow the recommendations of the infection control advisory panel established by the law. The makeup of this panel, also stipulated by law, includes a statistician, a microbiologist and representatives of consumers, physicians, infection control professionals and regulators.

Infections and procedures of a more serious nature and those that occur in a variety of hospitals and ASCs were considered for mandatory reporting. Hospitals and ASCs differ in what they report. Hospitals are required to report ventilator-associated pneumonia (VAP), central line-associated bloodstream infections (CLABSI) and surgical site infections (SSIs). The SSIs reported are those associated with procedures for abdominal hysterectomy, hip repair and coronary artery bypass surgery. ASCs report only SSI data, and are limited to reporting infections associated with procedures for hernia repair and breast surgery. To provide denominators for the infection rates, hospitals and ASCs report every one of the selected procedures regardless of whether the procedure results in an infection. Because patients in intensive care units are particularly at risk for HAIs, hospital reporting of CLABSI is done for

six specific intensive care units: medical, surgical, medical/surgical, coronary, neonatal and pediatric. SSIs are reported by facility rather than ICU. For reasons discussed below, hospitals report HOB elevation, on a voluntary basis, but not VAP.

To ensure that the data being collected are reliable, the DHSS established reporting requirements for the facilities. Following the lead of the Centers for Disease Control and Prevention (CDC), DHSS required that only hospitals that had at least 50 central line-days in the prior year must report during the current year. Both hospitals and ASCs must report SSIs if they performed at least 20 of the specified surgeries in the prior year. Hospitals with at least 100 ventilator patients are asked to report the number of ventilator patients and the number who have HOB elevation of at least 30 degrees, a practice that reduces the risk of ventilator associated pneumonia (VAP). Reporting is done through the Missouri Healthcare-Associated Infection Reporting System (MHIRS), a web-based system developed by DHSS staff and the Information Technology Support Division of the Office of Administration. MHIRS allows facilities to enter HAI data directly into a DHSS database on a monthly basis.

Registration for reporting by hospitals and ASCs occurs annually in March and April. Facilities report the number of central line-days per ICU, the number of relevant surgeries, and the number of ventilator patients that they had during the previous year. This information determines which facilities will be required to report the selected indicators to the DHSS.

Hospitals have been reporting CLABSI to the department since July 2005. Recording of SSI data by hospitals and ASCs began in January 2006. Reporting of VAPs has been temporarily replaced. Because hospitals do not use a standard method of diagnosing VAPs, an expert panel was convened to study the infection control issue. Based on their input, the advisory control panel recommended that a process measure, HOB elevation, be reported instead. The risk of contracting a VAP is substantially reduced for patients on ventilators if they have their heads elevated at least 30 degrees.<sup>4</sup> This measure has been included in a group of VAP measures endorsed by the Joint Commission on Accreditation of Healthcare Organizations. At the request of DHSS, Missouri hospitals began voluntarily reporting HOB elevation in November 2007. Reporting is done for four ICU types--medical, surgical, medical/surgical and coronary--plus all other ICUs combined.

In October 2010, the DHSS added historical data to the website. After reaching the main page for Missouri Healthcare Associated Infection Reporting, visitors can link to a table where they can select either hospitals or ASCs. For the selected facility, users can view the data for CLABSI, SSIs and HOB elevation. Currently displayed are data for 2006-2010. An integration of this data into the public report is in process and is projected to be completed in the first quarter of CY2015.

### **Reporting to the Public**

Figure 1 shows the main page of the public reporting site. This page introduces users to the site and presents a brief overview of HAIs. “Related Links” connects the user to other sites that have information on HAIs. “Healthcare-Associated Infections” provides expanded information on HAIs. “Instructions for Using this Site” helps the user interpret the selection page and data tables. “Definition of Terms” is a list of technical terms and their definitions. “Frequently Asked Questions” presents background information in an easy-to-read format. “Laws, Regulations and

Manuals” links the user to Section 192.667, RSMo and related chapters and regulations and allows the user to view the manuals and forms used by the facilities to report their data. “MRSA” summarizes information on Methicillin-resistant *Staphylococcus aureus* (MRSA) infections. “Infection Reporting Data” brings up the main selection page for accessing HAI data.

**Figure 1.**  
**Missouri Healthcare-Associated Infection Reporting**

Jay Nixon, Governor  
Gail Vasterling, Director

Missouri Department of  
**Health & Senior Services**

Search Health

Healthy Living    Senior & Disability Services    Licensing & Regulations    Disaster & Emergency Planning    Data & Statistics    Online Services

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**Missouri Health Care-Associated Infection Reporting**

Home » Data, Surveillance Systems & Statistical Reports » Missouri Health Care-Associated Infection Reporting

**Links:**

- [Infection Reporting Data \(Search Here\)](#)
- [Instructions for Using this Site](#)
- [About HAI Infections](#)
- [Definition of Terms](#)
- [Frequently Asked Questions](#)
- [Laws, Regulations & Manuals](#)
- [Reports](#)
- [Information for Providers](#)
- [MRSA](#)
- [Related Links](#)

This site displays data on **Healthcare-Associated Infections (HAIs)** as reported to the Department of Health and Senior Services (DHSS) by hospitals and ambulatory surgery centers. These facilities are required by **state law and regulation** to report data on selected HAIs, also known as nosocomial infections. Currently, data are reported for central line-associated bloodstream (CLAB) infections and surgical site infections (SSIs). Data on head-of-bed elevation (HOB) is also displayed. HOB is a process measure related to care in preventing ventilator-associated pneumonia.

Such infections as methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile*, vancomycin-resistant enterococcus (VRE), ventilator-associated pneumonia and others, are **not** included on this site. [Click here](#) for further information on these infections.

HAIs continue to be a major health problem in the United States. HAIs can be very serious, increasing the cost and length of hospital stays and even threatening lives. As a consumer, you should be proactive in your healthcare. The information on this site can help you to:

- Understand more about HAIs - what they are and why they occur.
- Be informed about hospital and ASC infection rates in Missouri.
- Learn what you, as a patient, can do to lower your risk of an HAI.

Keep in mind that a facility's experience with HAIs is only one thing to consider when choosing a facility. The advice of your physician, the experience of facility staff, and other factors unique to your situation should be considered as well. (Note: some facilities may not appear on this site because they did

**Data & Statistics**

- Profiles
- MICA
- Priorities MICA
- Community Health Improvement Resources (CHIR)
- Intervention MICA
- Births
- Deaths
- Patient Abstract System (PAS)
- Behavioral Risk Factor Surveillance System (BRFSS)
- County-Level Study (CLS)
- Healthcare-Associated Infection Reporting (HAI)
- ESSENCE

**Related Links**

- Cancer Registry
- Communicable Disease Reporting & Surveillance
- Environmental Public Health Tracking

*Bureau of Health Care Analysis & Data Dissemination*  
Missouri Department of Health and Senior Services  
PO Box 570  
Jefferson City, MO 65102-0570

Telephone: 573-751-6272  
Email: [info@health.mo.gov](mailto:info@health.mo.gov)

In Figure 2, the main selection page is shown. Users can choose to compare hospitals (or ASCs) to selected comparison groups, or to view a facility profile that includes all data reported by the facility. When viewing comparison data either CLABSI, SSIs or HOB can be selected. For CLABSI rates and HOB elevation percents, a specific type of ICU and a region of the state are selected. For SSIs, a facility type (hospital or ASC), a surgery type and a region are selected. Passing the computer mouse over a displayed map of Missouri produces a list of the reporting facilities by region. A link at the bottom of the page explains that facilities do not appear on the list if they had too few central line-days, surgeries or ventilator patients to meet the reporting requirements.

**Figure 2.**  
**Main Selection Page**

The screenshot shows the main selection page for Health Care-Associated Infection Reporting. The top navigation bar includes links for Healthy Living, Senior & Disability Services, Licensing & Regulations, Disaster & Emergency Planning, Data & Statistics, and Online Services. A banner for Jay Nixon, Governor, and Gail Vesterling, Director, is present. The main content area is titled "Health Care-Associated Infection Reporting" and shows the following steps:

- Step One: Select information type.** Options include "Comparison data for multiple hospitals or ASCs" (selected) and "Profile for individual hospital or ASC".
- Step Two: Select a reporting category.** Options include "Central Line-Associated Bloodstream (CLAB) Infection - Hospitals only" (selected), "Surgical Site Infection (SSI) - Hospitals or ASCs", and "Head-of-Bed Elevation (HOB) - Hospitals only".
- Step Three**: Options include "Hospital" (selected) and "ASC".
- Step Four**: "Select Surgery Type: Coronary artery bypass surge ▾".
- Step Five**: "To view a list of reporting facilities, place mouse over a region below. To view performance of hospitals, click on a region." Below this is a map of Missouri divided into regions: Northeast MO (red), Central MO/Northeast MO (blue), Southwest MO (yellow), and St. Louis MO (green). A callout box for the Central MO/Northeast MO region lists facilities: Capital Region Medical Center, Boone Hospital Center, and University of Missouri Health Care.

A sidebar on the right is titled "Data & Statistics" and includes links for Profiles, MICA, Priorities MICA, Community Health Improvement Resources (CHIR), Intervention MICA, Births, Deaths, Patient Abstract System (PAS), Behavioral Risk Factor Surveillance System (BRFSS), County-Level Study (CLS), Healthcare-Associated Infection Reporting (HAI), Cancer Registry, Communicable Disease Reporting & Surveillance, and Environmental Public Health Tracking. It also contains contact information for the Bureau of Health Care Analysis & Data Dissemination.

Figure 3 shows the web display version of a Hospital Comparison table for SSIs related to abdominal hysterectomy procedures. The symbols (● ○ ●) indicate whether the SSI rate was similar to, higher than, or lower than that of a comparison group. Hospitals can be compared to two different groups: 1) hospitals of a similar size (categories include: under 100 staffed beds, 100-299 staffed beds, or 300+ staffed beds) and 2) all reporting hospitals. For example, Figure 3 shows that Missouri Baptist Medical Center had similar abdominal hysterectomy-related infection rates compared to both similar sized facilities and statewide (Figure 3 is a partial listing of reporting hospitals in the St. Louis Metro – Southeast Missouri area).

**Figure 3.**  
**Surgical Site Infection (SSI), Hospital Comparison**

Missouri Department of Health & Senior Services						Jay Nixon, Governor Gail Vesterling, Director
Healthy Living	Senior & Disability Services	Licensing & Regulations	Disaster & Emergency Planning	Data & Statistics	Online Services	
<b>Health Care-Associated Infection Reporting Surgical Site Infection (SSI)</b>						
Procedure: Abdominal Hysterectomy St. Louis Metro - Southeast MO Reporting Period: October 1, 2012 to September 30, 2013						
<a href="#">Main Page</a>						
Facility Name	Hospital Performance Compared with Similar Size Facilities in Missouri	Hospital Performance Compared with All Missouri Facilities	Hospital Specific Information			
Barnes-Jewish Hospital	●	●	<a href="#">Data Comments</a>			
Barnes-Jewish St. Peters Hospital	●	●	<a href="#">Data Comments</a>			
Christian Hospital Northeast-Northwest	●	●	<a href="#">Data Comments</a>			
Mercy Hospital Jefferson	●	●	<a href="#">Data Comments</a>			
Mercy Hospital St. Louis	●	●	<a href="#">Data Comments</a>			
Missouri Baptist Medical Center	●	●	<a href="#">Data Comments</a>			
Poplar Bluff Regional Medical Center	●	●	<a href="#">Data Comments</a>			
Saint Francis Medical Center	●	●	<a href="#">Data Comments</a>			
Southeast Missouri Hospital	●	●	<a href="#">Data Comments</a>			
SSM DePaul Health Center	●	●	<a href="#">Data Comments</a>			

Facilities vary according to the seriousness of the procedures they undertake and the kinds of illnesses they treat. To make SSI comparisons among hospitals more valid, infection rates are adjusted for the level of procedure risk and the underlying condition of the patient. Factors that are taken into account in adjusting the rates are 1) the degree of contamination of the wound at the time of the operation, 2) the duration of the procedure and 3) the American Society of Anesthesiologists' physical status classification system. When a user selects 'Data' in a Hospital Comparison table infection rates are shown according to the risk factor group. This can be seen in Figure 4 for Missouri Baptist Medical Center. The hospital reported 219 abdominal hysterectomies and 3 infections in risk group 0, 192 procedures and 1 infection in risk group 1, and 44 procedures and no infections in risk group 2,3 (Groups 2 and 3 were combined per a National Nosocomial Infections System (NNIS) finding; they represented the same risk of infection<sup>5</sup>).

A small number of infections resulting from a small number of procedures can result in a relatively large infection rate. For example, if by chance there had been just one infection for the 44 procedures in risk group "2, 3", the rate would have been 2.27/100 procedures, which would be well above the state average. This should caution the user of the data to focus on the results of the statistical tests (table of circles) rather than particular rates. Rates based on a small number of patient procedures are considered unstable or unreliable.

**Figure 4.**  
**Surgical Site Infection (SSI), Hospital Infection Rates**

Missouri Department of  
**Health & Senior Services**

Jay Nixon, Governor  
Gail Vasterling, Director

Healthy Living   Senior & Disability Services   Licensing & Regulations   Disaster & Emergency Planning   Data & Statistics   Online Services

**Health Care-Associated Infection Reporting**  
**Surgical Site Infection (SSI)**

Missouri Baptist Medical Center  
Procedure: Abdominal Hysterectomy  
St. Louis Metro - Southeast MO  
Reporting Period: October 1, 2012 to September 30, 2013

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Risk Group	Number of Procedures	Number of Infections	Infection Rate (per 100 procedures)	Rate for Similar Size Hospitals (per 100 procedures)	Statewide Infection Rate (per 100 procedures)
0	219	3	1.4	0.7	0.6
1	192	1	0.5	1.1	1.0
2,3	44	0	0.0	1.8	2.0

N/A => Too few hospitals for rate calculations.

Note: When the infection rate for a hospital is higher/lower than a comparison group rate, the difference may not be statistically significant. Return to previous page to view performance of the hospital.

Users can also select a particular facility profile. As illustrated in Figure 5, facility specific profiles display all of the applicable CLABSI, SSI and HOB indicators for a facility in one location.

## Figure 5. Capital Region Medical Center Profile

Missouri Department of <b>Health &amp; Senior Services</b>						Jay Nixon, Governor Gill Vesterling, Director
Healthy Living	Senior & Disability Services	Licensing & Regulations	Disaster & Emergency Planning	Data & Statistics	Online Services	
<b>Health Care-Associated Infection Reporting</b>						
Capital Region Medical Center Central MO - Northeast MO Reporting Period: October 1, 2012 to September 30, 2013						
<a href="#">Main Page</a>						
<b>Central Line-Associated Bloodstream (CLAB) Infections</b>						
Intensive Care Unit (ICU)	Hospital Performance Compared with Similar Size Hospitals in Missouri	Hospital Performance Compared with All Missouri Hospitals	<a href="#">Data</a> <a href="#">Comments</a>			
MEDICAL/SURGICAL	●	●	<a href="#">Data</a> <a href="#">Comments</a>			
<b>Surgical Site Infections (SSI)</b>						
Surgery Type	Hospital Performance Compared with Similar Size Hospitals in Missouri	Hospital Performance Compared with All Missouri Hospitals	<a href="#">Data</a> <a href="#">Comments</a>			
CORONARY ARTERY BYPASS SURGERY	●	●	<a href="#">Data</a> <a href="#">Comments</a>			
HIP PROSTHESIS	●	●	<a href="#">Data</a> <a href="#">Comments</a>			
<b>Head of Bed (HOB) Elevation Process Measure*</b>						
Intensive Care Unit	Number of Patients on Ventilator	Number of Patients on Ventilator with Elevated HOB	Percent of * Patients with Elevated HOB	<a href="#">Comments</a>		
MEDICAL/SURGICAL	86	86	100%	<a href="#">Comments</a>		
* Elevating the head-of-bed (HOB) for ventilator patients helps to prevent ventilator-associated pneumonia. The HOB should be elevated at least 30 degrees for all qualifying patients. The goal is to have HOB elevation for 100 percent of a hospital's qualifying patients.						

### National Health Safety Network (NHSN)

In 2012, The Center for Medicare and Medicaid Services (CMS) began requiring that all critical access hospitals submit certain reports to them through NHSN. Beginning in September 2012, DHSS developed a way to download infection data for facilities that participate in the CMS program and submit infection data to NHSN. During the summer of 2012, with the assistance of four facilities, DHSS developed a method by which we could query the NHSN system and download that data for inclusion in the MHIRS data tables for the quarterly public reports. This option allows facilities to only report infection data once instead of reporting separately to both NHSN and DHSS. The NHSN downloads into MHIRS include data for both CLABSI and SSIs. Correct and reliable download of data from NHSN is challenging, but continual monitoring of the data results in valid reporting of HAI incidence and rates. Figure 6 shows an example of the NHSN query results for CLABSI.

**Figure 6.**  
**NHSN CLABSI Analysis**

orgID	summaryYM	locCDC	numCLDays	CLABCoun	CLABRate
11486	01/01/2013	IN:ACUTE:CC:MS	68	0	0
11486	02/01/2013	IN:ACUTE:CC:MS	29	0	0
11486	03/01/2013	IN:ACUTE:CC:MS	117	0	0
11486	04/01/2013	IN:ACUTE:CC:MS	73	1	13.699
11486	05/01/2013	IN:ACUTE:CC:MS	63	0	0
11486	06/01/2013	IN:ACUTE:CC:MS	43	0	0
11486	07/01/2013	IN:ACUTE:CC:MS	49	0	0
11486	08/01/2013	IN:ACUTE:CC:MS	37	0	0
11486	09/01/2013	IN:ACUTE:CC:MS	43	0	0
11486	10/01/2013	IN:ACUTE:CC:MS	56	0	0
11486	11/01/2013	IN:ACUTE:CC:MS	67	0	0
11486	12/01/2013	IN:ACUTE:CC:MS	48	0	0

## Data Summary

### *Central Line-Associated Bloodstream Infections (CLABSIs)*

Some hospitals have only one or two ICUs, while some may have all six ICU types that are required to report to the DHSS. Thus the total number of ICUs reporting exceeds the total number of hospitals that report. A total of 92 ICUs from 65 hospitals reported CLABSI data for January 1, 2013-December 31, 2013. Two of the 65 hospitals had an ICU with rates that were significantly higher than the state rate. One of the 65 hospitals had one or more ICU types with rates that were significantly lower than the state rate.

CLABSI data for all reporting hospital ICUs are summarized in Table 1. The statewide infection rates varied from 0.3/1000 central line-days for coronary ICUs to 1.2/1000 for pediatric ICUs.

**Table 1.  
Central Line-Associated Bloodstream Infection Summary Data by ICU**

**January 1, 2013-December 31, 2013 Reporting Period**

Intensive Care Unit (ICU)	Number of ICUs	Statewide Infection Rate
CORONARY	5	0.3
MEDICAL	9	1.0
MEDICAL/SURGICAL	51	0.9
NEONATAL	14	0.8
PEDIATRIC	7	1.2
SURGICAL	76	0.7

Note: The state infection rate is the number of infections per 1000 central line-days.

**Table 2.**  
**Comparison of Statewide Central Line-Associated Bloodstream Infection Rates by ICU and Reporting Period**

**Rates for Four Reporting Periods**

Intensive Care Unit	April 2010-March 2011	January 2011-December 2011	January 2012-December 2012	January 2013-December 2013
CORONARY	1.0	0.9	0.8	0.3
MEDICAL	1.0	1.3	0.8	1.0
MEDICAL/SURGICAL	0.9	0.9	2.5	0.9
NEONATAL	0.8	1.1	1.3	0.8
PEDIATRIC	1.9	3.2	2.1	1.2
SURGICAL	0.8	0.6	0.5	0.7

Note: Rates shown above are per 100 surgeries.

Table 2 compares the January 1, 2013-December 31, 2013 CLABSI rates to rates published in the three previous annual reports for trend analysis. Rates for CLABSIs in coronary ICUs have dropped consistently from the April 2010-March 2011 reporting period. In fact, the current CLABSI rate for this ICU type is less than half that of the earlier rate. CLABSI rates for pediatric ICUs also declined considerably again this year. Unfortunately, slightly increased rates in two ICU types, medical and surgical, have been reported in the past year. Rates for medical/surgical and neonatal ICUs decreased this year after rates had trended upward in CY2012.

### *Surgical Site Infections (SSIs)*

#### Hospitals

A total of 48 acute care hospitals (of the 137 acute care hospitals in Missouri) reported SSI data in 2013. By virtue of having performed at least 20 of the specific surgeries, 46 hospitals qualified to report hip repair surgeries, 32 reported abdominal hysterectomy surgeries, and 28 reported coronary artery bypass graft (CBGB) surgeries. When comparing hospital rates to overall state rates, one hospital had an infection rate that was significantly lower than the overall state rate, for hip repairs. In contrast, five hospitals had rates that were significantly higher than the state rate; three of these hospitals had statistically significantly high rates for hip procedures, while the other two hospitals reported high rates for CBGBs.

Additional SSI data for the hospitals is illustrated in Table 3. The statewide infection rates were 1.0/100 surgeries for hip repair, 0.8/100 for abdominal hysterectomy and 1.9/100 for CBGB surgery.

**Table 3.  
Hospitals: Surgical Site Infection Summary Data by Surgery Type**

**January 1, 2013-December 31, 2013 Reporting Period**

Procedure	Number of Facilities	Adjusted* Statewide Infection Rate (per 100 Surgeries)
ABDOMINAL HYSTERECTOMY	32	0.8
CORONARY ARTERY BYPASS SURGERY	28	1.9
HIP REPAIR	46	1.0

\*Adjusted for surgery severity level using the U.S. rate as a standard.

In Table 4, hospital SSI trends for the last four reporting periods are shown. Hip repair and abdominal hysterectomy rates declined from rates reported last year, while CBGB rates remained consistent. The rate for abdominal hysterectomy infections has decreased slightly since the last reporting period, from 0.9/100 surgeries to 0.8/100. Hip repair infection rates have decreased after remaining consistent over several reporting periods. The CBGB rate did not change between CY2012 and CY2013.

**Table 4.**  
**Hospitals: Trends for Statewide Surgical Site Infection Rates  
 by Surgery Type and Reporting Period**

**Rates for Four Reporting Periods**

Procedure	April 2010- March 2011	January 2011- December 2011	January 2012- December 2012	January 2013- December 2013
ABDOMINAL HYSTERECTOMY	0.8	1.4	0.9	0.8
CORONARY ARTERY BYPASS SURGERY	1.9	1.7	1.9	1.9
HIP REPAIR	1.3	1.5	1.3	1.0

### Ambulatory Surgery Centers (ASCs)

Infection rates for ASCs are usually lower than hospitals. ASCs tend to perform less serious surgeries and have generally healthier patient populations than inpatient facilities.<sup>6</sup> The relatively brief stays in the ambulatory setting reduces a patient's risk for infection; it also lessens the possibility of detecting post-surgical infections. A typical patient does not stay very long in an ASC (less than 24 hours) so an infection may not be discovered until days after the surgery. In this situation, the patient is more likely to seek care in an emergency room or a physician's office, and the ASC may never become aware of the infection.

Twenty-two (of the 112 Missouri ASCs that were open) reported SSI data in 2013. Sixteen ASCs qualified to report hernia repair surgeries and 12 reported breast surgeries. Table 5 demonstrates that the statewide rate per 100 surgeries was less than or equal to 0.5/100 surgeries for both types of surgeries.

**Table 5.**  
**Ambulatory Surgery Centers: Surgical Site Infection Rates  
By Surgery Type**

**January 1, 2013 – December 31, 2013 Reporting Period**

Procedure	Number of Facilities Reporting	Statewide Infection Rates (per 100 Surgeries)
BREAST SURGERY	12	0.50
HERNIA REPAIR	16	0.06

Table 6 shows that over the past four reporting periods there have been fluctuations in the reported rates for breast surgeries. Most recently, the rate increased from 0.36 in 2012 to 0.50 in 2013. The 2013 rate is the highest of the last 4 years. However, for the past 2 reporting periods there has been a sharp decline in the rate of SSIs for hernia repair; the 2013 rate was less than half the 2012 reported rate.

**Table 6.**  
**Ambulatory Surgical Centers:**  
**Trends for Statewide Surgical Site Infection Rates**  
**by Surgery Type and Reporting Period**

**Rates for Four Reporting Periods**

Procedure	April 2010-March 2011	January 2011-December 2011	January 2012-December 2012	January 2013-December 2013
BREAST SURGERY	0.18	0.05	0.36	0.50
HERNIA REPAIR	0.19	0.30	0.14	0.06

#### *Head- of- Bed (HOB) Elevation*

Forty-five hospitals reported HOB elevation for one or more ICU types. As related in Table 7, the most commonly reported ICU type, medical/surgical, was reported by 35 hospitals, while five hospitals reported on surgical ICUs and coronary ICUs, nine on their medical ICUs and “other” ICU types. The ideal is for every ICU to have appropriate HOB elevation for 100 percent of ventilator patients. Though a number of facilities reported 100 percent compliance, none of the ICU types reached 100 percent compliance for all facilities. On the other hand, for all categories of ICUs they averaged 98 percent compliance or better. HOB elevation compliance for individual facility/ICU combinations varied from 85 percent to 100 percent of ventilator patients. Twenty-eight (44.4%) of the 63 hospital/ICU combinations (i.e. Hospital A/surgical ICU and Hospital A/medical ICU would count as 2 combinations) reported 100 percent appropriate HOB elevation. This is a slight decrease from the compliance figures reported in 2012, when 32 of 66 hospital/ICU combinations (48.4%) reported 100% compliance. Rates from 2012 and 2013 for this calculation reflect a slight methodological change from previous reports.

**Table 7.**  
**Head of Bed Elevation Percentages**  
**by ICU**

**January 1, 2013-December 31, 2013 Reporting Period**

ICU	Number of Facilities	Number of Ventilator Patients*	Average** Percent of Ventilated Patients with HOB Elevation
CORONARY	5	741	99.0
MEDICAL	9	2269	98.3
MEDICAL/SURGICAL	35	6740	97.8
SURGICAL	5	1349	98.8
OTHER	9	3013	98.2

\* One ventilator patient is defined as a patient on a ventilator for one day. If a patient is on a ventilator for two days, that would be two ventilator patients; two patients on ventilators for two days would be four ventilator patients, etc.

\*\* The average was calculated as the average of the percents for the facility/ICU combinations. For example, the five facilities reporting on coronary ICUs had HOB elevation percents of 97, 98, 100, 100, and 100; the average of these five percents was 99, as shown in the above table.

Coronary ICUs reported the highest compliance, at 99.0%, while medical/surgical ICUs reported the lowest percentage of compliance, 97.8%.

## **Cautions**

The infection rates reported by the DHSS are affected by a facility's level of resources and commitment to infection control, the severity of the illnesses treated, and the care with which it collects and reports data. Beyond checking for obvious errors, the DHSS is not able to verify the data that the facilities submit each month, and it is likely that some facilities do a more accurate job of reporting than others. On the other hand, it is to each facility's advantage to accurately diagnose and monitor all infections. We believe most, if not all, facilities are guided by this philosophy.

A further consideration is that hospitals and ASCs vary in the types of patients they treat. A facility that treats severely ill patients will be at higher risk for HAIs. In order to mitigate this effect, CLABSI are reported separately for each type of ICU and as a rate per 1000 central-line days. SSI comparisons are adjusted for the severity level of the surgery and the condition of the patient and reported as a rate per 100 surgeries. While these adjustments help to make the data between facilities more comparable, users of the data should understand that these adjustments are imperfect, and the rates on Missouri's website should not be the sole basis for choosing a healthcare facility. A consumer who is trying to select a facility for healthcare should also consider the experience of the staff, the advice of their physician, and all other factors that are unique to his or her situation.

### **Endnotes:**

1. Guidance on public reporting of healthcare-associated infections: recommendations of the Healthcare Infection Control Practices Advisory Committee. McKibben L, Horan T, Tokars JI, Fowler G, Cardo DM, Pearson ML, Brennan PJ and the Healthcare Infection Control Practices Advisory Committee. *Am J Infect Control* 2005; 3(4):217-226.
2. Adverse events in hospitals: national incidence among Medicare beneficiaries, OEI-06—09-00090. Levinson, R., and Inspector General. Department of Health and Human Services- USA, November 2010.
3. Multistate point prevalence survey of health care-associated infections. Magill, SS, Edwards, JR, Bamberg, W, et al. *New England Journal of Medicine* 2014; 370: 1198-1208.
4. Guidelines for preventing health-care-associated pneumonia, 2003 recommendations of the CDC and the Healthcare Infection Control Practices Advisory Committee. *Healthcare Infection Control Practices Advisory Committee and Centers for Disease Control and Prevention. Respiratory Care* 2004; 49(8): 926.
5. National Nosocomial Infections Surveillance (NNIS) System report, data summary from January 1992 through June 2004, issued October 2004. National Nosocomial Infections Surveillance System. *American Journal of Infection Control* 2004; 32(8): 470.
6. Does competition from ambulatory surgical centers affect hospital surgical output? Courtemanche, C. and Plotzke, M. *Journal of Health Economics* 2010; 29(5): 765-773.